

Remarks

Reconsideration and allowance of the subject application are respectfully solicited.

Claims 1-4, 6-8, 12-14, 17 and 18 are now pending in the application, with Claims 1 and 6 being independent. Claims 5, 10, 11, 15 and 16 have been cancelled without prejudice. Claims 1, 6, 13, and 14 have been amended and Claims 17 and 18 have been added herein. Support for the amendments to the independent claims can be found at least at page 11, lines 3-14 of the original specification and Figs. 1 and 2. Newly-presented Claims 17 and 18 can find support in Example 2 beginning at page 16 of the specification. Of course, the claims are not intended to be limited in scope to these preferred embodiments.

Claims 1, 4 and 10-12 were rejected under 35 U.S.C. § 103 as being unpatentable over Japanese Laid-Open Patent Application No. 59-91079 (Togano et al.) in view of U.S. Patent No. 5,521,002 (Sneed) and either U.S. Patent No. 5,891,824 (Simpson et al.) or U.S. Patent No. 4,756,963 (Yamamoto et al.). Claims 1-4 and 10-12 were rejected under § 103 in further view of Japanese Laid-Open Patent Application No. 10-44605 (Nakanishi). Claim 5 was rejected under § 103 in further view of U.S. Patent No. 4,864,324 (Shirota et al.). Claims 13-16 were rejected under § 103 in further view of U.S. Patent No. 4,978,560 (Stone). Claims 6-8 were rejected under § 103 over Togano et al. in view of Simpson et al. or Yamamoto et al. and in further view of Nakanishi and Stone. These rejections are respectfully traversed.

As is recited in independent Claim 1, the present invention relates to a process for forming images comprising the steps of conducting recording on a recording medium provided with an image-receiving layer, the image-receiving layer containing inorganic particles having a diameter of 0.1 to 10 μm for imparting a matted appearance to the surface of the image-receiving layer, laminating a laminating film supplied from a roll, having a thickness of 2 to 40 μm and consisting of a thermoplastic resin film composed of two thermoplastic polymer layers onto the image-receiving layer, with the glass transition point of one of the polymer layers on the side directly laminated onto the image-receiving layer being lower than that of the other of the polymer layers on the side opposite to the image-receiving layer, and plasticizing and smoothing the surface of the thermoplastic resin film that is opposite to the surface in contact with the image-receiving layer with heating and pressurizing means to bond a back side of the thermoplastic resin film onto the image-receiving layer.

As is recited in independent Claim 6, the present invention relates to an apparatus for forming images that includes an ink-jet head, a laminate section and heating and pressurizing means. The ink-jet head records on a recording medium. The laminate section laminates a laminating film supplied from a roll, having a thickness of 2 to 40 μm and consisting of a thermoplastic resin film composed of two thermoplastic polymer layers onto the recording medium on which recording has been conducted. The glass transition point of one of the polymer layers on the side of the recording medium is lower than that of the other of the polymer layers on the side opposite to the recording medium. The heating and pressurizing means plasticizes and smooths the thermoplastic resin film by heating and

pressurizing and bonding a back side of the thermoplastic resin film onto an image-receiving layer of the recording medium. The surface roughness (Ra) of the surface of the heating and pressurizing means that comes into contact with the thermoplastic resin film is 3 μ m or less.

With the above method and arrangement, images can be formed on a recording medium with fast ink absorbency and good coloring stability, and glossiness can also be imparted to the recorded images. In particular, by providing a recording medium having an image-receiving layer containing inorganic particles having a diameter of 0.1 to 10 μ m, the recording medium can have good ink absorbency and coloring stability, but such would lead to a matted surface of the medium. In order to obtain a glossy surface, after images are formed on the medium, a film having a thickness of 2 to 40 μ m is placed on the image receiving layer of the medium followed by a plasticizing and smoothing the film with heating and pressurizing means. In addition, the laminated film is supplied from a roll and the thermoplastic resin film is composed of two thermoplastic polymer layers, wherein the glass transition point of one of the polymer layers on the side directly laminated onto the image-receiving layer is lower than that of the other of the polymer layers on the side opposite to the image-receiving layer (or recording medium). As a result, any inter-layer fusion in the stock of the thermoplastic resin film wound as a roll can be prevented and excellent glossy surfaces after lamination can be obtained.

Togano et al. describes a recorder in which recording paper 2 is recorded by recording heads 12 and then fed to a roller pair 27 where a laminate material 22 is also fed. The roller pair nips 27 the paper and laminate material and feeds the paired materials

toward pressure roller pair 28, where the paired materials are nipped and heated to melt the laminate material onto the paper and protect the recorded images.

As understood by Applicants, Togano et al. merely teaches that after forming images on a transparent resin film having poor fixability of ink images, such as a polyester film, laminate coating is effected. Togano et al. is not directed to imparting glossiness on a recording medium having unevenness by laminating the recording medium. Moreover, as shown in Fig. 1, the laminating films in Togano et al. are in the form of a sheet and are not supplied from a roll. Further, the laminate sheet is not composed of two layers and, therefore, there is no concern of inter-layer fusion.

Accordingly, Togano et al. fails to disclose or suggest at least a laminating film supplied from a roll, having a thickness of 2 to 40 μm , and consisting of a thermoplastic resin film composed of two thermoplastic polymer layers, or that the glass transition point of one of the polymer layers on a side directly laminated onto the image-receiving layer (or the side of the recording medium) is lower than that of the other of the polymer layers on the side opposite to the image-receiving layer (or the side opposite to the recording medium), as is recited in independent Claims 1 and 6.

Thus, Togano et al. fails to disclose or suggest important features of the present invention recited in the independent claims.

Sneed describes a matte type ink jet film that uses fillers to provide surface texture. However, Sneed is not believed to remedy the deficiencies of Togano et al. noted above with respect to the independent claims.

Simpson et al. is directed to a transparent protective sheet for a thermal dye transfer print, but is also not believed to disclose or suggest the features discussed above as being deficient in Togano et al.

Yamamoto et al. describes a protective member for protecting a print, with the protective member including a substrate and a transfer layer. Transfer layer 1 includes a first layer 1a with a fluorescent whitening agent and a second layer 1b which contains a light stabilizer and an ultraviolet light absorber. More layers are used in other embodiments. While Yamamoto et al. may describe two or more layers in the transfer layer, Yamamoto et al. is not believed to disclose or suggest the remaining deficiencies in Togano et al. discussed above.

In Nakanishi, a gloss imparting treatment for thermal recording paper is described. The thermal recording paper includes several thermal developing layers of various colors. Any unevenness caused by scratching by the thermal head is resolved by a heating and pressing treatment using a mirror-like surface. However, Nakanishi is also not believed to remedy the deficiencies of Togano et al. noted above.

Shirota et al. describes a color image forming method and its ink, and describes the use of a transparent protective member or laminate. Thermoplastic resins can be used in forming the transparent protective member and the member can be used as a single-layer or a multi-layer. However, there is no disclosure in Shirota et al. of supplying the transparent protective member from a roll or of any specific characteristics of the member relating to glass transition points of the layers.

Stone relates to a hot roll glosser method for making resin-coated microencapsulated media transparent. Media or sheet material 20 is processed in a nip between a pair of rolls 10, 12. A resin surface 22 is provided on the media. The nip temperature is maintained below a free air glass transition temperature of the resin. However, Stone is also not believed to remedy the deficiencies of the citations noted above with respect to the independent claims.

The remaining citations of record have been reviewed, but are not believed to be any more relevant than those discussed above.

Thus, independent Claims 1 and 6 are patentable over the citations of record. Reconsideration and withdrawal of the § 103 rejections are respectfully requested.

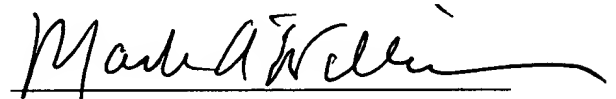
For the foregoing reasons, Applicants respectfully submit that the present invention is patentably defined by independent Claims 1 and 6. Dependent Claims 2-4, 7, 8, 12-14, 17 and 18 are also allowable, in their own right, for defining features of the present invention in addition to those recited in their respective independent claims. Individual consideration of the dependent claims is requested.

This Amendment After Final Rejection is an earnest attempt to advance prosecution and reduce the number of issues, and is believed to clearly place this application in condition for allowance. This Amendment was not earlier presented because Applicants earnestly believed that the prior Amendment placed the subject application in condition for allowance. Accordingly, entry of this Amendment under 37 CFR 1.116 is respectfully requested.

Applicants submit that the present application is in condition for allowance. Favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action, and an early Notice of Allowability are requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Mark A. Williamson", written over a horizontal line.

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